Documentation Update Package #3

DOE-2.1E

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DOE-2.1E - Update #3

This package contains documentation updates to DOE-2.1E;
we recommend that you incorporate these changes immediately.

Changes to the DOE-2.1E Supplement

Appendix A -- Hourly Report Variable List

Page	Section of Documentation or Subprogram	Description of Change
A.59	PLANT - VARIABLE-TYPE = PLANT	modified Variables #3, #10, #19, #21
A.63	PLANT - VARIABLE-TYPE = STM-BOILER ...	modified Variable #3
A.64	PLANT - VARIABLE-TYPE = ELEC-STM-BOILER ...	modified Variable #3
A.65	PLANT - VARIABLE-TYPE = ABSOR1-CHLR ...	modified Variable #3
A.66	PLANT - VARIABLE-TYPE = OPEN-CENT-CHLR ...	modified Variables #3, #18
A.67	PLANT - VARIABLE-TYPE = ABSORG-CHLR	modified Variable #3
A.69	PLANT - VARIABLE-TYPE = ENG-CHLR	modified Variable #3
A.70	PLANT - VARIABLE-TYPE = DBUN-CHLR	modified Variable #3
A.71	PLANT - VARIABLE-TYPE = OPEN-TWR ...	modified Variables #20, #21
A.72	PLANT - VARIABLE-TYPE = DIESEL-GEN	modified Variable #1
A.73	PLANT - VARIABLE-TYPE = GTURB-GEN	modified Variable #1, removed variable #13
A.74	PLANT - VARIABLE-TYPE = STURB -GEN	modified Variable #1
A.75	PLANT - VARIABLE-TYPE = HTANK-STORAGE	modified Variable #3
A.76	PLANT - VARIABLE-TYPE = CTANK-STORAGE	modified Variable #3
A.77	PLANT - VARIABLE-TYPE = FURNACE	modified Variable #3
A.78	PLANT - VARIABLE-TYPE = DHW-HEATER	modified Variable #3

Please replace p. A.59 in the DOE-2.1E Supplement, in Appendix A, Hourly Report Variable List, with this page.

PLANT

VARIABLE-TYPE = PLANT

Variable-List Number	Variable in FORTRAN Code	Description
1	ENGYLD(1,IHR)	Heating load from SYSTEMS (Btu/hr)
2	ENGYLD(2,IHR)	Cooling load from SYSTEMS (Btu/hr)
3	SYSKW	Electric load from SYSTEMS (kW)
4	IHON	Standby heating flag
5	ICON	Standby cooling flag
6	ENGYLD(17,IHR)	Regeneration load passed to PLANT from SYSTEMS (Btu/hr)
7		
8	PDEM(1)	Total heating load to be met by PLANT (Btu/hr)
9	PDEM(2)	Total cooling load to be met by PLANT (Btu/hr)
10	PDEM(3) * KWBTU	Total electric load to be met by PLANT (kW)
11		
12	Note 1.	Total PLANT fuel use (Btu/hr). Variable 12 now includes engine chiller and gas absorption chiller fuel use.
13		
14	LATYPE(1)	Heating LOAD-ASSIGNMENT pointer
15	LATYPE(2)	Cooling LOAD-ASSIGNMENT pointer
16	LATYPE(3)	Electric LOAD-ASSIGNMENT pointer
17	GAS+OIL	Gas and oil resource consumed elsewhere than PLANT (Btu/hr)
18	HWTR(1HR)	Hot water resource consumed elsewhere than PLANT (Btu/hr)
19	HPELEC(1HR)	Hot water loop pump electricity consumed (kW)
20	HHGAIN	Hot water loop pump heat gain (Btu/hr)
21	CPELEC	Cold water loop pump electricity consumed (kW)
22	CHGAIN	Cold water loop pump heat gain (Btu/hr)

Note 1.   EQDEM(4,1) + EQDEM(4,2) + EQDEM(4,5) +
            EQDEM(4,6) + EQDEM(4,22) + EQDEM(4,21) +

Please replace p. A.63 in the DOE-2.1E Supplement, in Appendix A, Hourly Report Variable List, with this page.

PLANT

VARIABLE-TYPE = STM-BOILER (EQTYP=1)
or HW-BOILER (EQTYP=2)

Variable-List Number	Variable in FORTRAN Code	Description
1	EQDEM(1,IEQTYP)	Heating load (Btu/hr)
2		
3	EQDEM(3,IEQTYP)	Electric input (kW)
4	EQDEM(4,IEQTYP)	Fuel input (Btu/hr)
5		
6	ISIZE	Sizes running
7	OPCAP(IEQTYP)	Nominal capacity (Btu/hr)
8	PLR	Average part-load ratio
9	FRAC	Fraction of hour boiler was on
10	HIRCOR	Fuel consumption correction factor

Please replace p. A.64 in the DOE-2.1E Supplement, in Appendix A, Hourly Report Variable List, with this page.

PLANT

VARIABLE-TYPE = ELEC-STM-BOILER (IEQTYP=3), ELEC-HW-BOILER (IEQTYP=4), or ELEC-DHW-HEATER (IEQTYP=7)

Variable-List Number	Variable in FORTRAN Code	Description
1	EQDEM(1,IEQTYP)	Heating load (Btu/hr)
2		
3	EQDEM(3,IEQTYP)	Electric energy consumption (kW)
4		
5		
6	ISIZE	Sizes running
7	OPCAP(IEQTYP)	Nominal capacity (Btu/hr)
8	LOSS	Losses from machine (Btu/hr)

Please replace p. A.65 in the DOE-2.1E Supplement, in Appendix A, Hourly Report Variable List, with this page.

PLANT

VARIABLE-TYPE = ABSOR1-CHLR (IEQTYP=13)
or ABSOR2-CHLR (IEQTYP=14)

Variable-List Number	Variable in FORTRAN Code	Description
1	EQDEM(1,IEQTYP)	Cooling load (Btu/hr)
2		
3	EQDEM(3,IEQTYP)	Electric energy consumed (kW)
4	EQDEM(4,IEQTYP)	Steam energy input (Btu/hr)
5	EQDEM(5,IEQTYP)	Cooling tower load (Btu/hr)
6	ISIZE	Sizes running
7	OPCAP(IEQTYP)	Nominal capacity (Btu/hr)
8	RCAP	Available capacity ratio (Btu/Btu)
9	CAP	Available capacity (Btu/hr)
10	PL	Average part-load ratio
11	PLR	Operating part-load ratio
12	TTOWR	Entering condenser temperature (°F)
13	CHWT	Leaving chilled water temperature (°F)
14	HIR1	Heat input ratio temperature correction
15	HIR2	Heat input ratio part-load correction
16	HIR	Adjusted heat input ratio
17		

Please replace p. A.66 in the DOE-2.1E Supplement, in Appendix A, Hourly Report Variable List, with this page.

PLANT

VARIABLE-TYPE = OPEN-CENT-CHLR (IEQTYP=8), OPEN-REC-CHLR (IEQTYP=9), HERM-CENT-CHLR (IEQTYP=10), HERM-REC-CHLR (IEQTYP=11)

Variable-List Number	Variable in FORTRAN Code	Description
1	EQDEM(1,IEQTYP)	Cooling load (Btu/hr)
2	EQDEM(2,IEQTYP)	False load (Btu/hr)
3	EQDEM(3,IEQTYP)	Electric energy consumed (kW)
4		
5	EQDEM(5,IEQTYP)	Cooling tower load (Btu/hr)
6	ISIZE	Sizes running
7	OPCAP(IEQTYP)	Nominal capacity (Btu/hr)
8	RCAP	Available capacity ratio
9	CAP	Available capacity (Btu/hr)
10	PLR	Operating part-load ratio
11	FRAC	Fraction of hour machine ran
12	ECT	Entering condenser temperature (°F)
13	CHWT	Leaving chilled water temperature (°F)
14	EIR1	Electric input ratio temperature correction
15	EIR2	Electric input ratio part-load correction
16	EIRN	Adjusted electric input ratio
17	ELECH	Rejected electrical heat (Btu/hr)
18	FANE	Condenser fan energy (kW)

Please replace p. A.67 in the DOE-2.1E Supplement, in Appendix A, Hourly Report Variable List, with this page.

PLANT

VARIABLE-TYPE = ABSORG-CHLR (IEQTYP=15)

Variable-List Number	Variable in FORTRAN Code	Description
1	EQDEM(1,IEQTYP)	Cooling load (Btu/hr)
2		
3	EQDEM(3,IEQTYP)	Electric energy consumed (kW)
4	EQDEM(4,IEQTYP)	Fuel input (cooling) (Btu/hr)
5	EQDEM(5,IEQTYP)	Cooling tower load (Btu/hr)
6	ISIZE	Sizes running
7	OPCAP(IEQTYP)	Nominal capacity (Btu/hr)
8	RCAPI	Available capacity ratio (cooling) (Btu/Btu)
9	CAP	Average capacity (cooling) (Btu/hr)
10	PL	Average part-load ratio (cooling)
11	PLR	Operating part-load ratio (cooling)
12	TC	Entering condenser temperature (°F)
13	CHWT	Leaving chilled water temperature (°F)
14	HIR1	Heat input ratio chilled water correction
15	HIR2	Heat input ratio part-load correction
16	HIR3	Heat input ratio condenser temperature correction
17	HIR	Heat input ratio
18	HEAT	Heat input (cooling) (Btu/hr)
19	QCOND	Desiccant regeneration heat from condenser (Btu/hr)
20	QSUPL	Supplemental desiccant regeneration heat (Btu/hr)
21	QREG	Desiccant regeneration heat (Btu/hr)
22	GABQC	Cooling output (Btu/hr)
23	GABQH	Heating output (Btu/hr)
24	GABFC	Fuel use (cooling); includes fuel used for regeneration
25	GABFH	Fuel use (heating) (Btu/hr)

Please replace p. A.69 in the DOE-2.1E Supplement, in Appendix A, Hourly Report Variable List, with this page.

PLANT

VARIABLE-TYPE = ENG-CHLR (IEQTYP=16)

Variable-List Number	Variable in FORTRAN Code	Description
1	EQDEM(1,IEQTYP)	Cooling load (Btu/hr)
2		
3	EQDEM(3,IEQTYP)	Electric energy consumed (kW)
4	EQDEM(4,IEQTYP)	Fuel input (Btu/hr)
5	EQDEM(5,IEQTYP)	Cooling tower load (Btu/hr)
6	ISIZE	Sizes running
7	OPCAP(IEQTYP)	Nominal capacity (Btu/hr)
8	RCAPI	Available capacity ratio
9	OPCAP*RCAPI	Available capacity (Btu/hr)
10	PLR	Operating part-load ratio
11	FRAC	Fraction of hour chiller ran
12	ECT	Entering condenser temperature (°F)
13	CHWT	Leaving chilled water temperature (°F)
14	COP1	COP temperature correction
15	COP2	COP part-load correction
16	COP	COP
17	ECFUEL	Fuel used (Btu/hr)
18	HREJ1	Recoverable heat efficiency temperature correction (Btu/hr)
19	HREJ2	Recoverable heat efficiency part-load correction (Btu/hr)
20	HREJ	Recoverable heat (Btu/hr)

Please replace p. A.70 in the DOE-2.1E Supplement, in Appendix A, Hourly Report Variable List, with this page.

PLANT

VARIABLE-TYPE = DBUN-CHLR (IEQTYP=12)

Variable-List Number	Variable in FORTRAN Code	Description
1	EQDEM(1,IEQTYP)	Cooling load (Btu/hr)
2	EQDEM(2,IEQTYP)	False load (Btu/hr)
3	EQDEM(3,IEQTYP)	Electric energy consumed (kW)
4		
5	EQDEM(5,IEQTYP)	Cooling tower load (Btu/hr)
6	ISIZE	Sizes running
7	OPCAP(IEQTYP)	Nominal capacity (Btu/hr)
8	RCAP	Available capacity ratio
9	CAP	Available capacity (Btu/hr)
10	PLR	Operating part-load ratio
11	FRAC	Fraction of hour machine ran
12	ECT	Entering condenser temperature (°F)
13	CHWT	Leaving chilled water temperature (°F)
14	EIR1	Electric input ratio temperature correction factor
15	EIR2	Electric input ratio part-load correction factor
16	EIR3	Electric input ratio heat recovery correction factor
17	EIRW	Corrected electric input ratio (Btu/Btu)
18	HTREC	Recoverable heat (Btu/hr)

Please replace p. A.71 in the DOE-2.1E Supplement, in Appendix A, Hourly Report Variable List, with this page.

PLANT

VARIABLE-TYPE = OPEN-TWR (ITOWR=17)
or CLOSED-TWR (ITOWR=18)

Variable-List Number	Variable in FORTRAN Code	Description
1	LOAD	Total tower load, including pump heat (Btu/hr)
2		
3	ELEC	Total electrical, including pumps (kW)
4		
5		
6	NCELL	Number of cells running
7	OPCAP(ITOWR)	Nominal operating capacity (Btu/hr)
8	GPM	Total fluid flow through tower (gpm)
9	RANGE	Temperature drop through tower (°F)
10	APP	Fluid approach to wetbulb temperature (°F)
11	TTOWR	Leaving tower temperature (°F)
12	NCELL	Number of cells running
13	FRA	Variable common between range/approach performance curve and wetbulb/gpm curve
14	GPMRAT	Ratio of actual flow at current conditions to flow at 95-85-78 CTI rating conditions
15	GPMCAP	Flow capacity per cell at current load, setpoint and wetbulb (gpm)
16	GPMCEL	Current flow rate per cell (gpm)
17	AIRCEL	Ratio of required airflow at current conditions to maximum airflow (design airflow)
18	EFRAC	Fraction of nominal fan energy this hour
19	FRANCHI	Fraction of hour the fan runs at higher speed
20	EFAN	Fan energy consumption (kW)
21	EPUMP	Pump energy consumption (kW)
22	MINCEL	Minimum number of cells that can handle load
23	MAXCEL	Maximum number of cells that can handle load
24	NDCSCH	Direct cooling schedule value
25	IFC	Direct cooling: 0 = not used, 1 = used this hour

Please replace p. A.72 in the DOE-2.1E Supplement, in Appendix A, Hourly Report Variable List, with this page.

PLANT

VARIABLE-TYPE = DIESEL-GEN (IEQTYP=21)

Variable-List Number	Variable in FORTRAN Code	Description
1	EQDEM(1,IEQTYP)	Electric load (kW)
2		
3		
4	EQDEM(4,IEQTYP)	Fuel Energy Consumed (Btu/hr)
5		
6	ISIZE	Sizes running
7	OPCAP(IEQTYP)	Nominal capacity (Btu/hr)
8	ELECD	Operating load (Btu/hr)
9	PLR	Part-load ratio
10	ELECFD	Efficiency of diesel engine (Btu/Btu)
11	THLOF	Ratio of jacket/lube-oil heat to fuel (Btu/Btu)
12	EJLD	Jacket/lube-oil heat recovered (Btu/hr)
13	THHIF	Ratio of exhaust heat recovered to fuel (Btu/Btu)
14	EEXHD	Exhaust heat recovered (Btu/hr)
15	TEXD	Temperature of the exhaust (°F)
16	THTOF	Ratio of total heat recovered to fuel (Btu/Btu)
17	ETOT	Total heat recovered (Btu/hr)
18		
19		
20		

Please replace p. A.73 in the DOE-2.1E Supplement, in Appendix A, Hourly Report Variable List, with this page.

PLANT

VARIABLE-TYPE = GTURB-GEN (IEQTYP=22)

Variable-List Number	Variable in FORTRAN Code	Description
1	EQDEM(1,IEQTYP)	Electric load (kW)
2		
3		
4	EQDEM(4,IEQTYP)	Fuel energy consumed (Btu/hr)
5		
6	ISIZE	Sizes running
7	OPCAP(IEQTYP)	Nominal capacity (Btu/hr)
8	ELECG	Operating load (Btu/hr)
9	PLR	Part-load ratio
10	ELECFG	Efficiency of the gas turbine (Btu/Btu)
11	EEXHG	Exhaust heat recovered (Btu/hr)
12	EXHF	Ratio of exhaust heat recovered to fuel (Btu/Btu)
~~13~~	~~TEXG~~	~~Temperature of the exhaust (°F)~~ *[removed May 2000]*

Please replace p. A.74 in the DOE-2.1E Supplement, in Appendix A, Hourly Report Variable List, with this page.

PLANT

VARIABLE-TYPE = STURB-GEN (IEQTYP=23)

Variable-List Number	Variable in FORTRAN Code	Description
1	EQDEM(1,IEQTYP)	Electric load (kW)
2		
3		
4	EQDEM(4,IEQTYP)	Steam energy input (Btu/hr)
5		
6	ISIZE	Sizes running
7	OPCAP(IEQTYP)	Nominal capacity (Btu/hr)
8	PLR	Part-load ratio
9	TURBF	Internal turbine efficiency (Btu/Btu)
10	ELEFF	Efficiency of steam turbine (Btu/Btu)
11	ENREC	Ratio of recovered heat to steam input (Btu/Btu)
12	FSLOSS	Condenser losses (Btu/hr)
13	WASTE	Recovered heat (Btu/hr)

Please replace p. A.75 in the DOE-2.1E Supplement, in Appendix A, Hourly Report Variable List, with this page.

PLANT

VARIABLE-TYPE = HTANK-STORAGE (IEQTYP=19)

Variable-List Number	Variable in FORTRAN Code	Description
1	EQDEM(1,IEQTYP)	Energy delivered (Btu/hr)
2		
3	EQDEM(3,IEQTYP)	Electric energy consumed (kW)
4	EQDEM(4,IEQTYP)	Energy stored (Btu/hr)
5		
6	ISIZE	Sizes running
7	OPCAP(IEQTYP)	Operating capacity (Btu/hr)
8	HTGIVE	Heat available to be given out (Btu/hr)
9	HTASK	Heat requested for storage (Btu/hr)
10	HFREEZ-CFREEZ	Heat needed to prevent freezing (Btu/hr)
11	ISTORH	Storage demand flag
12	TEMPH	Tank temperature (°F)
13	HLOSS	Tank loss (Btu/hr)
14	REALHT	Heat in tank (relative to 0°F) (Btu/hr)
15	EHSTOR	Useful heat in tank (Btu/hr)

Please replace p. A.76 in the DOE-2.1E Supplement, in Appendix A, Hourly Report Variable List, with this page.

PLANT

VARIABLE-TYPE = CTANK-STORAGE (IEQTYP=20)

Variable-List Number	Variable in FORTRAN Code	Description
1	EQDEM(1,IEQTYP)	Cooling energy delivered (Btu/hr)
2		
3	EQDEM(3,IEQTYP)	Electric energy consumed (kW)
4	EQDEM(4,IEQTYP)	Cooling energy stored (Btu/hr)
5		
6	ISIZE	Sizes running
7	OPCAP(IEQTYP)	Operating capacity (Btu/hr)
8	CDGIVE	Cooling energy available to be given out (Btu/hr)
9	CDASK	Cooling energy requested for storage (Btu/hr)
10	CFREEZ	Heat needed to prevent freezing (Btu/hr)
11	TEMPL	Tank temperature (°F)
12	CLOSS	Tank loss (Btu/hr)
13	REALCD	Heat in tank (relative to 0°F) (Btu)
14	ECSTOR	Useful cold in tank (Btu)

Please replace p. A.77 in the DOE-2.1E Supplement, in Appendix A, Hourly Report Variable List, with this page.

PLANT

VARIABLE-TYPE = FURNACE

Variable-List Number	Variable in FORTRAN Code	Description
1	EQDEM(1,5)	Space heating load (Btu/hr)
2		
3	EQDEM(3,5)	Electric energy consumed (kW)
4	EQDEM(4,5)	Fuel consumed (Btu/hr)
5		
6	ISIZE	Sizes running
7	OPCAP(5)	Operating capacity (Btu/hr)
8	PLR	Average part-load ratio
9	HIRCOR	Fuel consumption correction factor

Please replace p. A.78 in the DOE-2.1E Supplement, in Appendix A, Hourly Report Variable List, with this page.

PLANT

VARIABLE-TYPE = DHW-HEATER

Variable-List Number	Variable in FORTRAN Code	Description
1	EQDEM(1,6)	Process or domestic hot water load (Btu/hr)
2		
3	EQDEM(3,6)	Electricity consumed (kW)
4	EQDEM(4,6)	Fuel consumed (Btu/hr)
5		
6	ISIZE	Sizes running
7	OPCAP(6)	Operating capacity (Btu/hr)
8	PLR	Part-load ratio
9	HIRCOR	Fuel consumption correction factor